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Evaluation of Neck Ultrasound and Neck Dissection Skills Training Course

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ABSTRACT

Background: Neck ultrasound (US) and neck dissection are skills of ear nose throat (ENT) specialists would master in order to diagnose and treat disorders in the head and neck region. Identifying areas that need improvement and updating the training programs accordingly will contribute to ENT specialists providing safer and more effective care to their patients.

Methods: Afterward, practical neck US training was performed and then selective neck dissections were performed on a fresh frozen cadaver. In both applications, the previously prepared neck US skill assessment scale and neck dissection surgical skill scale were used to assess the skills. Feedback was given to the students according to the evaluation results. At the end of the course, the general course evaluation was made with the SETh short course evaluation scale.

Results: Of the 14 specialists participated (6 were female and 8 were male) with an age range of 31-38 (average 33.64) participated in the BB and TCO 2024-2025 period training. The shortest experience time was a 1-year specialist and the longest was a 6-year specialist (average: 3.03). The average scores obtained from the students' performance for each process step were calculated and presented comparatively in the tables.

Conclusion: These results can be used in developing the training program in future course planning. This research will also be an example for the development of skill laboratory applications in ENT and other branches.

Keywords: Neck dissection, neck ultrasound, skill assessment

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Introduction

Skills training is one of the most important parts of specialty training. These skills can be classified as surgical and non-surgical skills. Training programs in each specialty should be evaluated regularly. Training programs should be updated according to the results of these evaluations and changing current needs.

Neck ultrasound (US) and neck dissection are skills of Ear Nose Throat (ENT) specialists would master in order to diagnose and treat disorders in the head and neck region. The ability to correctly perform and interpret neck US is crucial for identifying and characterizing pathologies in the neck. On the other hand, neck dissection is a surgical procedure required for staging and treating head and neck cancers.

In general, regular evaluation of neck US and neck dissection skills training is important to ensure that ENT specialists develop the skills necessary to diagnose and treat disorders in the head and neck region. The evaluations may include technical competence, knowledge of anatomy and pathology, decision-making abilities, and general competence in performing these procedures. Identifying areas that need improvement and updating the training

programs accordingly will contribute to ENT specialists providing safer and more effective care to their patients.

The Head Neck and Thyroid Surgery School is one of the sub-branch schools established under the umbrella organization of Turkish Ear Nose and Throat Schools (TENTS) in 2014.[1] Since its establishment, TENTS has been organizing training programs for ENT specialists regularly every year. These trainings consist of 2 parts: theoretical and practical. In March 2025, training on neck dissection and neck US on fresh frozen cadavers was provided in the practical section. In both of these skills trainings, each student was evaluated with structured evaluation forms (Tables 1 and 2).[2,3] In addition, structured feedback was received from the students regarding the school's skills training session.[4] In this article, the evaluation results of the applied skills training of the Head Neck and Thyroid Surgery School 2024-2025 were presented with the literature from the data obtained.

Material and Methods

The head and neck school skill training session was held on March 7, 2025, at TORLAK Surgical Anatomy and Educatıon Center. Since neck US was to be performed for the first time, resources related to the pre-course were shared with the students.[4] Theoretical presentations were made regarding the skills. Afterward, practical neck US training was performed and then selective neck dissections were performed on a fresh frozen cadaver. Selective neck dissection refers to a cervical lymphadenectomy in which there is preservation of one or more of the lymph node groups that are routinely removed in the radical neck dissection. The lymph node groups removed are based on the patterns of metastases, which are predictable relative to the primary site of disease.

In both applications, the previously prepared neck US skill assessment scale (NUS-SAS) and neck dissection surgical skill scale (ND-SSS) were used to assess the skills (Tables 1 and 2).[2,3] Feedback was given to the students according to the evaluation results. The performance of each student was evaluated, and the level they reached at the end of the training session was determined. The US and selective neck dissection scores were filled in while giving feedback to the students during the dissection, and the names of the students were not recorded. In this sense, the aim was formative evaluation.

In the NUS training, each NUS-SAS step was explained to all students, and US was used for demonstration. Following this, each student performed neck US in turn with the instructor. All students performed neck US 3 times in this manner. In the final application of US, the students' performances were evaluated with NUS-SAS. Each student performed neck dissection on a fresh frozen cadaver once. When the neck dissection was completed, the student's performance was evaluated with ND-SSS. At the end of the course, the general course evaluation was made with the SETh short course evaluation scale.

MAIN POINTS

- *Neck ultrasound and dissection are basic skills that ENT specialist must learn.*
- *These skills' education is performed in a skill laboratory with simulation tools or on a fresh cadaver.*
- *Evaluation of these skills trainings is important for the development of training programs.*

Verbal informed consent was obtained from the students who participated in the study. The ethics committee approval was obtained for this research from Pamukkale University Non-invasive Clinical Reserach Ethics Committee (no: 08, date: 22.04.2025). The arithmetic mean of each item was taken in the statistical evaluation of the data.

Results

Of the 14 specialists participated (6 were female and 8 were male) with an age range of 31-38 (average 33.64), in the Head Neck and Thyroid Surgery School of TENTS 2024-2025 period training. The shortest experience time was a 1-year specialist and the longest was a 6-year specialist (average: 3.03). The average scores obtained from the students' performance for each process step were calculated and presented comparatively in the tables. Neck US performance evaluation results are shown in Table 1, and neck dissection performance evaluation results are shown in the first columns of Table 2. The average scores obtained from the students' performance for each procedure step are given. The evaluation results with SETh are shown in Table 3.

It was reported that these courses exceeded the trainees' expectations and that it was requested that different surgeries be included in cadaver dissection. In light of this feedback, it was interpreted that there is a need for diversification of skill training (such as thyroid surgery, etc.) for the head and neck schools to be held in the coming years.

Discussion

Today, in terms of patient safety, skill training in medical education is first performed in a skill laboratory with simulation tools or on a fresh cadaver. These skill applications should be performed until the student reaches the expected competence before starting the applications with the patient. During these trainings, each skill should be evaluated with assessment tables and structured feedback should be given to the student. Although skill laboratory applications are performed in the country, skill assessment tables are not used, and the results of the training program are not evaluated. Evaluations made with skill tables during the course process provide students with the opportunity to receive instant feedback and develop their skills. In addition, the evaluation of skill training is also important for assessing the success of the course. These results can be used in developing the training program in future course planning. Feedback was given to students using structured skill tables for the first time. In this research, the evaluation results of the skill tables and the course evaluations received from the students will be shared. This research will also be an example for the development of skill laboratory applications in ENT and other branches.

Today, the area of use of US in medicine and medical education has expanded greatly. For example, US has been made available to medical school students for topographic anatomy education.[5,6] On the other hand, it is used as an examination tool, like a stethoscope in many branches of internal medicine and surgery, such as gynecology, gastroenterology, anesthesiology, and orthopedics. The ENT specialists have also started to use US for a while now. It is used in the field of ENT for the diagnosis, treatment, and monitoring of masses in the head and neck. It is also used in interventional procedures such as abscess drainage or biopsy.[4] In this sense, US is used more widely by ENT specialists working in the head and neck field as a sub-branch. For this reason, it has been included in the program

Table 1. The First Column Containing Item Averages Is Not Included in the Neck US Skill Assessment Table

Neck Ultrasound Performance Evaluation Table					
Item Score Averages		**Failed**	**Achieved with Help**	**Achieved with Minimal Help**	**Easy and Smooth Implementation**
3.15 ± 0.8	Preparation of ultrasound				
3.84 ± 0.3	Positioning the patient for neck ultrasound				
3.69 ± 0.4	Knowledge of head and neck ultrasound anatomy				
1.69 ± 1.1	Recognition of head and neck congenital anomalies				
3.53 ± 0.7	Recognition of the SCM muscle				
3.53 ± 0.7	Recognition of the carotid artery				
3.38 ± 0.7	Recognition of the thyroid gland and measurement of its dimensions				
3.0 ± 0.81	Recognition of pathologies in the thyroid gland and definition of their characteristics				
1.53 ± 1.0	Recognition of the parathyroid gland and definition of their pathologies				
1.92 ± 1.0	Evaluation of central area lymph nodes (level 5-6)				
3.15 ± 0.6	Recognition of the submandibular gland and definition of their pathologies				
3.23 ± 0.7	Recognition of the parotid gland and definition of their pathologies				
2.61 ± 1.0	Evaluation of lymph nodes located at levels 1-2-3-4 and 5 of the neck				
2.69 ± 1.0	Recognition of pathological lymph nodes-determination of their anatomical localization-definition				
3.38 ± 0.5	Application of ultrasound-guided biopsy (FNAB-Tru-cut)				
1.30 ± 0.75	Preparation preparation after biopsy (lam-Tg washout)				

of the Head and Neck School. In fact, it should be included in basic ENT specialization training, like its examples in the world.[7] It has been suggested that it should be included in the ENT specialization core program in the country. The use of US by ENT specialists makes it easier to reach a definitive diagnosis[7] The Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) has determined

Table 2. The First Column Containing the Item Arithmetic Means Is not Included in the Neck Dissection Surgical Skill Assessment Table

Neck Dissection Skill Evaluation Table					
Item Score Averages		**Failed**	**Achieved with Help**	**Achieved with Minimal Help**	**Easy and Smooth Implementation**
3.57 ± 1.0	Positioning for dissection				
4.00 ± 0.0	Completion of skin incision				
3.92 ± 0.2	Elevation of subplatysmal flap				
3.07 ± 1.3	Delineation of area 1A				
3.07 ± 1.2	Identification and protection of marginal mandibular nerve				
3.14 ± 1.2	Identification and protection of facial vessels				
3.64 ± 0.6	Dissection of fat tissue and lymph nodes up to the edge of the mandible and inclusion in the specimen				
3.50 ± 0.9	Dissection of mylohyoid muscle, identification, and protection of lingual nerve				
3.57 ± 0.8	Dissection of deep plane of submandibular gland				
3.85 ± 0.5	Dissection of fascia over SCM muscle and inclusion in the specimen				
3.85 ± 0.5	Identification and dissection of accessory nerve (XI) over digastric muscle				
3.71 ± 0.6	Dissection and limitation of digastric muscle				
3.78 ± 0.5	Dissection and exposure of accessory nerve (XI)				
2.5 ± 1.3	Dissection of retrospinal region				
3.35 ± 0.9	Dissection of area between internal jugular vein and accessory nerve (XI)				
2.85 ± 1.2	Identification of deep branches of cervical plexus				
3.38 ± 0.9	Specimen dissecting from deep plane				
3.30 ± 1.0	Determining the inferior dissection margin				
3.42 ± 1.0	Peeling the fascia over the internal jugular vein				
3.71 ± 0.6	Identifying and protecting the vagus nerve (X)				
2.64 ± 1.3	Dissection of the thyro-lingual-facial branches				
3.57 ± 0.6	Completing the dissection by revealing the medial margin of the dissection				

Table 3. Arithmetic Means of Scores Given to SETh Short Interactive Course Evaluation Scale Items

Course General Evaluation Results	
SETh Short Interactive Course Evaluation Scale	**Mean**
This course was worth the time spent	4.35 ± 0.7
Participants were able to get involved quickly	4.42 ± 0.6
My expectations were met	3.92 ± 0.9
I felt my perspective was valued	3.85 ± 1.2
My perspective on the subject changed by attending this course	4.21 ± 0.8
There was enough time to absorb the information provided	3.42 ± 1.1
I felt supported	4.21 ± 1.1
The course helped me understand what I already know	4.35 ± 0.4
The course helped me understand what I needed to know	4.57 ± 0.5
The course will change my behavior on this subject	4.42 ± 0.6
The course changed my thinking about my needs	4.21 ± 0.9
I now want to know more about this subject	4.64 ± 0.4
I enjoyed this course	4.14 ± 0.7
The trainers were able to engage all students	4.28 ± 0.8
The trainers were able to deal with conflicts	4.28 ± 0.8
The trainers were able to help this course achieve its goal	4.50 ± 0.6
The choice of trainer was appropriate	4.64 ± 0.4

standards regarding the use of US in the head and neck.[8] This course has provided a starting point for the use of US in head and neck examination. More comprehensive training is required to achieve the competence determined by EFSUMB. The EFSUMB uses more complex measurement and evaluation tools than those applied to evaluate the students' performance in this training process.[9] The study by Todsen et al[9] is also an example of the use of structured measurement and evaluation tools, such as the ones used in head and neck US training. During the training of specialist students, all surgical or non-invasive skills included in the core training program should be evaluated and documented with surgical skill tables or skill tables both in the laboratory and in the hospital during the application process.[10-12] In this course, the performance of the students was evaluated using a measurement and evaluation tool developed by The Royal College of Radiologists, which is relatively easier to use.[2] When the scores of the students from the evaluation items are assessed, it is seen that the participants have a good command of the neck anatomy and can quickly recognize the structures in the neck using US (Table 1). This course is a start for learning how to use head and neck US. The difficult steps will be developed over time with experience and as patients are seen. It is hoped that in the coming years, the use of head and neck US will become more widespread among ENT specialists, similar to examples around the world.

A neck dissection was also performed on a fresh frozen cadaver. Neck dissection is included in the core program of ENT specialist training. The ENT specialists are expected to be able to perform neck dissection. However, in the country, specialist training may vary according to the conditions of the clinic where training is provided, the patient profile, and the number of students currently receiving specialist training. In addition, ENT specialists probably do not perform neck dissection during the compulsory service period. Complex skills, such as surgical procedures, are forgotten if they are not practiced. All ENT specialist students are expected to perform surgical skills on fresh frozen cadavers up to the expected level of proficiency before starting to practice on patients during their specialist training period. However, in this country, fresh frozen cadaver dissections have become more widespread in recent years. Students in the course may have encountered cadaver dissection for the first time. Such external factors may have influenced the neck dissection performance assessment scores. Nevertheless, they performed at acceptable levels of success in most neck dissection steps (Table 2).

When the course evaluation results are examined, it is seen that the satisfaction of the students with the course is quite high (Table 3). Especially in the skill trainings, the active participation of the students increases student satisfaction. At this stage, they have the opportunity to practice skills that they may have encountered for the first time in a safe environment with experienced trainers. The validity of both skill applications performed in this course is very high. Fresh frozen cadavers are the closest training material to the real surgery environment. In the head and neck US application, the trainees performed neck US on each other. In the next stage of the neck US, simulated patients with a mass in the neck can be invited and thyroid examinations can be performed. Alternatively, mannequins produced for this purpose can be used. Another point that draws attention in the general course evaluation is the high scores given to the trainers. The fact that experienced trainers are assigned in the field has an effect on these scores. In this study, the 2024-2025 Head Neck and Thyroid Surgery School skill training was evaluated with structured skill evaluation tables, and feedback was given to the participants. It is recommended that structured skill evaluation tables be developed and used in interventional or non-interventional application trainings such as surgical procedures in the field of ENT. Such evaluation results can also be used to improve educational processes. The Head Neck and Thyroid Surgery School has made an exemplary application with this application.

Data Availability Statement: *The data that support the findings of this study are available upon request from the corresponding author.*

Ethics Committee Approval: *This study was approved by the Ethics Committee of Pamukkale University, (Approval no: 08; Date: 22.04.2025).*

Informed Consent: *Verbal consent was obtained from the students who agreed to take part in the study.*

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